

Claims

1. An agriculturally or horticulturally cultivated soil comprising one or more plant seed, plant seedling, growing plant or mature plant and an agriculturally or horticulturally effective amount of Jordanite.

2. The cultivated soil of claim 1, said Jordanite comprising, as a major zeolitic component, phillipsite, and palagonite.

3. The cultivated soil of claim 1, said plant being an agricultural plant.

4. The cultivated soil of claim 1, said plant being a horticultural plant.

5. The cultivated soil of claim 1, said Jordanite comprising one or more additional zeolites selected from the group consisting of faujasite and chabazite.

6. The cultivated soil of claim 1, wherein said plant is a grass.

7. A lawn according to claim 6.

8. A pasture according to claim 6.

9. A grass component of a golf course according to claim 6.

10. The cultivated soil of claim 6, wherein said grass is turfgrass.

11. The cultivated soil of claim 1, wherein said plant is a ground-covering plant or an ornamental plant.

12. The cultivated soil of claim 11, wherein said ornamental plant is a flower.

13. The cultivated soil of claim 12, wherein said flower is one member selected from the group consisting of carnations, mums, golden pothos, impatiens, pansies, violets, begonias, gardenias, hydrangea, lilacs, sunflowers, orchids, pointsettia, phalenopsis, bromiliad, snapdragons, alstroemeria, daisies, gerbera daisies, freesia, liatris, antherum, delphinium, roses, lilies, irises, daffodils, hyacinths and tulips.

14. The cultivated soil of claim 1, wherein said plant is a vegetable plant selected from the group consisting of asparagus, beans, beets, bell peppers, broccoli, cabbage, cantaloupe, carrot, cauliflower, celery, collard, cucumbers, pickles, eggplant, fennel, garlic, honeydew melon, kohlrabi, lettuce, leek, muskmelon, mustard green, onion, green onion, okra, pea, pepper (*Capsicum* spp.), potato, pumpkin, radish, spinach, squash, sweet corn, sweet potato, tomato, turnip, watermelon, yam, and zucchini plants.

15. The cultivated soil of claim 1, wherein said plant is an herb, a shrub, a fern, or a succulent.

16. The cultivated soil of claim 1, where said plant is a vine.

17. The cultivated soil of claim 16, wherein said vine is a grape vine.

18. The cultivated soil of claim 1, wherein said plant is a tree.

19. The cultivated soil of claim 18, wherein said tree is a fruit tree selected from the group consisting of apple, apricot, avocado, banana, cherry, coconut, grape, grapefruit, lemon, lime, nectarine, olive, orange, peach, pear, plum, prune, tangelo, tangerine, and kiwi trees.

20. The cultivated soil of claim 1, wherein said plant is barley, corn (maize), emmer, oats, rice (*Oryza* spp.), rye, sorghum, spelt, triticale, wheat, or wild rice (*Zizania* spp.).

21. The cultivated soil of claim 1, wherein said plant is a pulse crop selected from the group consisting of soybean, dry bean, lentil, lupin, and pea plants.

22. The cultivated soil of claim 1, wherein said plant is a berry plant selected from the group consisting of cranberry, blackberry, blueberry, boysenberry, gooseberry, raspberry, and strawberry plants.

23. The cultivated soil of claim 1, wherein said plant is a nut-bearing plant selected from the group consisting of almond, cashew, hazelnut, pecan, and walnut plants.

24. The cultivated soil of claim 1, wherein said plant is an oil-producing plant selected from the group consisting of canola, cranbe, cottonseed, flax, mustard, peanut, rape, safflower, and sunflower plants.

25. The cultivated soil of claim 1, wherein said plant is one member selected from the group consisting of cotton, pineapple, sugarcane, sugarbeet, tobacco, and hemp plants.

26. The cultivated soil of claim 18, wherein said tree is an ornamental tree.

27. The cultivated soil of claim 1, said Jordanite further comprising one or more members selected from the group consisting of smectite and calcite.

28. The cultivated soil of claim 1, said Jordanite further comprising one or more micronutrient, fertilizer, herbicide, fungicide, or pesticide.

29. The cultivated soil of claim 28, wherein said micronutrient is one or more member selected from the group consisting of boron, copper, iron, manganese, molybdenum, and zinc ions.

30. In the cultivation of an agricultural or horticultural plant, the improvement comprising using an agriculturally or horticulturally cultivated soil comprising one or more plant seed, plant seedling, growing plant or mature plant and an agriculturally or horticulturally effective amount of Jordanite.

5 31. The cultivation of claim 30, said Jordanite comprising, as a major zeolitic component, phillipsite, and palagonite.

32. An agricultural cultivation according to claim 30.

33. A horticultural cultivation according to claim 30.

34. The cultivation of claim 30, said Jordanite comprising, as a major zeolitic component, phillipsite, and palagonite.

35. The cultivation of claim 30, comprising cultivating an agricultural plant.

36. The cultivation of claim 30, comprising cultivating a horticultural plant.

37. The cultivation of claim 30, said Jordanite comprising one or more additional zeolites selected from the group consisting of faujasite and chabazite.

38. The cultivation of claim 30, wherein said plant is a grass.

39. Cultivating a lawn according to claim 38.

40. Cultivating a pasture according to claim 38.

41. Cultivating a grass component of a golf course according to claim 38.

42. The cultivation of claim 38, wherein said grass is turfgrass.

20 43. The cultivation of claim 30, wherein said plant is a ground-covering plant or an ornamental plant.

44. The cultivation of claim 30, wherein said ornamental plant is a flower.

45. The cultivation of claim 44, wherein said flower is one member selected from the group consisting of carnations, mums, golden pothos, impatiens, pansies, violets, begonias, gardenias, hydrangea, lilacs, sunflowers, orchids, pointsettia, phalenopsis, bromiliad, snapdragons, alstroemeria, gerbera daisies and other daisies, freesia, liatris, antherum, delphinium, roses, lilies, irises, daffodils, hyacinths and tulips.

46. The cultivation of claim 30, wherein said plant is a vegetable plant selected from the group consisting of asparagus, beans, beets, bell peppers, broccoli, cabbage, cantaloupe, carrot, cauliflower, celery, collard, cucumbers, pickles, eggplant, fennel, garlic, honeydew

melon, kohlrabi, lettuce, leek, muskmelon, mustard green, onion, green onion, okra, pea, pepper (*Capsicum* spp.), potato, pumpkin, radish, spinach, squash, sweet corn, sweet potato, tomato, turnip, watermelon, yam, and zucchini plants.

47. The cultivation of claim 30, wherein said plant is an herb a shrub, a succulent or a fern.

48. The cultivation of claim 30, where said plant is a vine.

49. The cultivation of claim 48, wherein said vine is a grape vine.

50. The cultivation of claim 30, wherein said plant is a tree.

51. The cultivation of claim 50, wherein said tree is a fruit tree selected from the group consisting of apple, apricot, avocado, banana, cherry, coconut, grape, grapefruit, lemon, lime, nectarine, olive, orange, peach, pear, plum, prune, tangelo, tangerine, and kiwi trees.

52. The cultivation of claim 30, wherein said plant is barley, corn (maize), emmer, oats, rice (*Oryza* spp.), rye, sorghum, spelt, triticale, wheat, or wild rice (*Zizania* spp.).

53. The cultivation of claim 30, wherein said plant is a pulse crop selected from the group consisting of soybean, dry bean, lentil, lupin, and pea plants.

54. The cultivation of claim 30, wherein said plant is a berry plant selected from the group consisting of cranberry, blackberry, blueberry, boysenberry, gooseberry, raspberry, and strawberry plants.

55. The cultivation of claim 30, wherein said plant is a nut-bearing plant selected from the group consisting of almond, cashew, hazelnut, pecan, and walnut plants.

56. The cultivation of claim 30, wherein said plant is an oil-producing plant selected from the group consisting of canola, cranbe, cottonseed, flax, mustard, peanut, rape, safflower, and sunflower plants.

57. The cultivation of claim 30, wherein said plant is one member selected from the group consisting of cotton, pineapple, sugarcane, sugarbeet, tobacco, and hemp plants.

58. The cultivation of claim 30, said Jordanite further comprising one or more members selected from the group consisting of smectite and calcite.

59. The cultivation of claim 30, said Jordanite further comprising one or more micronutrient, fertilizer, pesticide, herbicide, or fungicide.

60. The cultivation of claim 59, wherein said micronutrient is one or more

member selected from the group consisting of boron, copper, iron, manganese, molybdenum, and zinc ions.

1. A method for determining the presence of a metal ion in a sample, comprising: (a) reacting the sample with a reagent to form a complex; (b) measuring the absorbance of the complex; and (c) comparing the absorbance to a standard curve.